

INTERNATIONAL PRELIMINARY EXAMINATION REPORT



(PCT Article 36 and Rule 70)

Applicant's or agent's file reference -?-	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB 03/05100	International filing date (day/month/year) 24.11.2003	Priority date (day/month/year) 27.01.2003
International Patent Classification (IPC) or both national classification and IPC H02K35/02		
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- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 9 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

- This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 31.03.2004	Date of completion of this report 22.04.2005
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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB 03/05100

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-3 as originally filed

Claims, Numbers

1-10 received on 17.06.2004 with letter of 02.06.2004

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

see separate sheet

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-10
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-10
Industrial applicability (IA)	Yes: Claims	1-10
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item I

Basis of the report

With letter dated 02.06.04 amendments of claim 1 have been filed.

The amendments concern the following features and are rendered recognizable by means of underlining:

- i) the tumbling magnet electricity generating system is adapted to generate electricity substantially irrespective of a direction of relative proximal motion between said second magnet (2) and said first magnet (9),
- ii) the tumbling chamber (10) is adapted to provide axisless rotation freedom to said first magnet (9).

Moreover the feature

- iii) "to run an electric appliance" of the original independent claim 1 has been deleted.

Feature (iii) is not considered to be essential so that it is considered allowable to delete it;

Concerning feature (i) there is reference in the original description (page 1, last paragraph):

"There may be some arbitrary, relative motion between the first magnet 9 and the second magnet 2. The magnets depicted with dotted lines represent alternative, relative motions of the second magnet 2 with respect to the first magnet 9. As the first magnet 9 and the second magnet 2 pass close to one another, the mutual interaction of the magnetic fields is sufficient to cause the first magnet 9 to tumble..."

This text considered together with claim 1 and picture 1 that shows different kind and of directions (arrows) of relative motions between the first and the second magnet can be seen as a basis for the amendment in feature (i).

On the other hand the amendment of feature (ii) is considered to introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT.

In fact for amended feature (ii) no basis can be found in the original application. Concerning

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rotation freedom the original claims only say that the tumbling chamber (10) is of sufficient dimensions to allow the first magnet (9) to freely tumble (claim 1). The dependent claims do not help much in defining the kind of freedom and how it is achieved. They also do not define the shape of the magnets and of the chamber:

according to claim 4 the first magnet (9) is substantially of a known geometric shape and

according to claim 5 the tumbling chamber (10) is substantially of a known geometric shape.

What we know from the original description (page 2, paragraph 2) concerning rotational freedom is that:

the first magnet can be a disc shaped permanent magnet and is enclosed in the chamber and that

the chamber is of sufficient dimensions to allow the first magnet to tumble freely.

The shape of the chamber is not explicitly described in the text of the original application. The pictures tell us that the chamber can have a cylindrical shape: in fact the cross section in picture 1 is a circle and in picture 3 (that in a view taken at an angle differing of 90° with respect to the view of picture 1) is a square.

In the opinion of the examiner the skilled person reading the original documents even combining the teaching of the claims, of the description and of the pictures would not directly and unambiguously recognize that the system is provided with means for allowing an axisless rotation freedom of the first magnet.

In fact the skilled person would consider that also a limited freedom as for instance the freedom of rotation around a single axis (for instance along a diameter of the a disc shaped permanent magnet or an axis perpendicular to the plane of the disc and passing through the Center of the disc) could allow a free rotation of the magnet around said axis within the cylindrical chamber and generate electrical energy.

An axisless rotation freedom is something special that the skilled person would not consider as

implicitly disclosed in the description.

So the information concerning axisless rotation freedom is not considered to be disclosed in any form in the original application documents.

It can be agreed that the original application documents are silent concerning the way the first magnet 9 is fixed or suspended within the tumbling chamber 10.

However the examiner is of the opinion that from this silence the skilled person would not directly and unambiguously understand that the first magnet is not fixed or suspended to any place of the chamber as interpreted by the Applicant in his letter of 02.06.04 (see page 2). He only would understand that the fixing or suspension means are not defined in the Application, so that usual suspension means must be provided.

Summing up the examiner is of the opinion that the use of the expressions "set free" and "freely tumble" combined with the fact that the suspension means of the first magnet in the chamber is not defined in the original documents do not allow to conclude that absolute (axisless) rotation freedom of the magnet in the chamber was directly and unambiguously described in the original application.

For the reasons given above, the amendment of feature (ii) is considered to go beyond the original disclosure. According to Rule 70.2(c) of the Regulations Under PCT the report is established as if such amendment had not been made.

Consequently the same arguments given in the written communication concerning novelty and inventive step are maintained (with slight modifications) in the present preliminary examination report.

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1) The following documents are considered:

DI:

WO 01/33700 A (RELIGHT) 10 May 2001 (2001-05-10)

D2:

US-A-S 606 210 (LIN) 25 February 1997 (1997-02-25)

2) The present application does not satisfy the criterion set forth in Article 3 3(3) PCT because the subject-matter of Claim 1 does not involve an inventive step (Rule 65(I)(2) PCT).

3) DI, which is considered to represent the most relevant state of the art describes a tumbling magnet [see pictures 2, 4, 7,81 electricity generating system for supplying electricity to at least one electrical device, comprising a tumbling chamber [represented for instance by the space enclosed by the coil (3) see picture 10 and description page 10, paragraph 21, a first magnet (2) arranged within the tumbling chamber, and a coil (3) looped around the tumbling chamber, adapted such that the tumbling chamber is of sufficient dimensions to allow the first magnet (2) to freely tumble, and such that on proximal relative motion of said first magnet and a second element (1) arranged externally to the tumbling chamber, the mutual interaction of the magnetic fields is sufficient to cause the first magnet (2) to tumble in the tumbling chamber, generating a varying magnetic flux through the coil (3)

such that a corresponding potential difference is formed across opposite ends of the coil (3), generating electricity to run an electric appliance.

In the device described in D1 the second element is represented by a metallic element (1).

Also in the device described in D1 shows the new feature (i) of claim 1. In fact the tumbling magnet electricity generating system is adapted to generate electricity substantially irrespective of a direction of relative proximal motion between said second element and said first magnet (2).

The subject-matter of the new independent Claim 1 (excluding the aspect of the axisless freedom of rotation in feature ii) differs from the apparatus described in D1, in that said second element is a second magnet.

The problem to be solved by the independent claim may be regarded as to modify the apparatus known from D1 in order to obtain an alternative solution,

- 4) The solutions proposed in the new independent claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

For the skilled person (but also for the average person) it is well known that it is possible to impress a force or a rotation to a magnet (for instance in a compass) by bringing in the vicinity of said magnet an element made of a ferromagnetic material or alternatively a second magnet.

The distinguishing feature of claim 1 (with respect to D1) belongs therefore to the general knowledge of the skilled person.

Claim 1 represents merely a combination of the teaching of D1 with one of at least two

straightforward possibilities (belonging to the general knowledge of the skilled person) from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed.

Moreover the use of a second magnet for rotating a first magnet is known from D2. D2 describes a rotating magnet electricity generating system for supplying electricity to at least one electrical device, comprising a rotation chamber (31), a first magnet (32) arranged within the rotation chamber (31), a second magnet (16) arranged externally to the rotation chamber (31) and a coil (34) looped around the rotation chamber (31), adapted such that the rotation chamber (31) is of sufficient dimensions to allow the first magnet (32) to freely rotate, and such that on proximal relative motion of said first and second magnets, the mutual interaction of the magnetic fields is sufficient to cause the first magnet (32) to rotate in the rotating chamber (31), generating a varying magnetic flux through the coil (11) such that a corresponding potential difference is formed across opposite ends of the coil (34), generating electricity to run an electric appliance.

In this manner the skilled person would also come to the solution described in claim 1 by combining the teaching of D1 and D2.

Moreover the rotating chamber (31) of the device described in D2 is substantially of non-magnetic material [column 3, line 21.

- 5) Dependent Claims and do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step: in fact they only contain features which are not novel or a matter of normal design.

CLAIMS

1. A tumbling magnet electricity generating system for supplying electricity to at least one electric device, comprising a tumbling chamber (10), a first magnet (9) arranged within the tumbling chamber (10), a second magnet (2) arranged externally to the tumbling chamber (10), and a coil (11) looped around the tumbling chamber (10), the tumbling chamber (10) being of sufficient dimensions to allow the first magnet (9) to rotate (tumble) freely, and such that on proximal relative motion of said first and second magnets (9 and 2), the mutual interaction of the magnetic fields is sufficient to cause the first magnet (9) to rotate (tumble) in the tumbling chamber (10), generating a varying magnetic flux through the coil (11) such that a corresponding potential difference is formed across opposite ends of the coil (11), wherein: said tumbling magnet electricity generating system is adapted to generate electricity substantially irrespective of a direction of relative proximal motion between said second magnet (2) and said first magnet (9), and said tumbling chamber (10) is adapted to provide axis-less rotation freedom to said first magnet (9).
2. A tumbling magnet electricity generating system as claimed in claim 1, wherein the tumbling chamber (10) is substantially of non-magnetic material.
3. A tumbling magnet electricity generating system as claimed in claim 1 wherein the coil (11) comprises an insulated copper wire wound around the outer surface of the tumbling chamber (10), the opposite ends of the coil (11) being electrically connected to terminals of an electric appliance.
4. A tumbling magnet electricity generating system as claimed in claim 1 wherein the first magnet (9) is substantially of a known geometric shape.
5. A tumbling magnet electricity generating system as claimed in one of claims 1 and 2, wherein the tumbling chamber (10) is substantially of a known geometric shape.
6. A bicycle comprising the tumbling magnet electricity generating system of claim 1 for providing illumination.
7. A tumbling magnet electricity generating system as claimed in claim 1 or 6, wherein the second magnet (2) is fixedly attached to a wheel of a bicycle.
8. A tumbling magnet electricity generating system as claimed in claim 1 or 6 wherein the electricity generating unit containing the first magnet (9) is fixedly attached stationary relative to and non-rotate relative to a part of a bicycle frame by a supporting member.

9. A tumbling magnet electricity generating system as claimed in any one of claims 1, 6, 7 and 8, wherein on rotation of a bicycle wheel the second magnet (2) passes proximal to the first magnet (9) once during each rotation of said wheel.

10. A safety signal generator for a bicycle comprising a tumbling magnet electricity generating system of any one of claims 1, 6, 7, 8, 9 and 10, and at least one light emitting diode electrically connected to the coil (11) of the tumbling magnet electricity generating system wherein a rotation of the first magnet (9) causes a varying electric current to flow through the coil (11) and illuminate the light emitting diode.